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EXAMINER	
WEST, JEFFREY R	
ART UNIT	**PAPER NUMBER**
2857	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/598,912	CHARARA ET AL.	
	Examiner	Art Unit	
	Jeffrey R. West	2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 June 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 3-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 September 2006* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Drawings

2. The drawings in Figures 1, 4, and 5 are objected to because they do not have sufficiently descriptive labels, specifically, blank boxes in drawings should be labeled descriptively unless it is a well-known component.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 3, 6, 7, 9, 11, 12, 14, 16, and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,470,275 to Dubinsky (incorporating by reference U.S. Patent No. 5,001,675 to Woodward).

MPEP §2163.07(b) [R-3]: Incorporation by Reference: Instead of repeating some information contained in another document, an application may attempt to incorporate the content of another document or part thereof by reference to the document in the text of the specification. The information incorporated is as much a part of the application as filed as if the text was repeated in the application, and should be treated as part of the text of the application as filed.

With respect to claim 1, Dubinsky discloses a method for characterizing a formation with a logging tool positioned within a borehole surrounded by the formation (column 4, lines 29-42, column 4, line 65 to column 5, line 24, and column 5, lines 59-65) the method comprising: exciting with the logging tool the formation with an acoustic wave propagating into the formation (column 3, lines 28-42 and column 6, lines 36-47); measuring with the logging tool a seismo-electromagnetic signal produced by the acoustic wave within the formation (column 3, lines 28-42 and column 6, lines 36-47); exciting with the logging tool the formation with an electromagnetic exciting field (column 6, lines 5-15); measuring with the logging tool an electromagneto-seismic signal produced by the electromagnetic exciting field within the formation (column 3, lines 28-42 and column 6, lines 5-15); and analyzing the measured seismo-electromagnetic signal and the measured electromagneto-

seismic signal to evaluate characterizing parameters of the formation (column 6, lines 15-18 and 45-52).

With respect to claim 3, Dubinsky discloses measuring an acoustic response signal, the acoustic response signal being produced by the acoustic exciting; estimating acoustic properties of the formation from the acoustic response signal (column 6, lines 36-52); measuring an electromagnetic response signal, the electromagnetic response signal being produced by the electromagnetic exciting; estimating electromagnetic properties of the formation from the electromagnetic response signal (column 6, lines 5-18).

With respect to claim 6, Dubinsky discloses that the analyzing takes into consideration propagating of the acoustic wave within the formation (column 3, lines 28-33, column 6, lines 10-18, and column 6, line 64 to column 7, line 8).

With respect to claim 7, Dubinsky discloses that the seismo- electromagnetic signal is a seismo-electric signal (i.e. measured using a hydrophone) (column 6, lines 35-48).

With respect to claim 9, Dubinsky discloses that the electromagneto- seismic signal is a magneto-seismic signal (column 6, lines 5-15 – see also Woodward; column 1, lines 14-27 and column 3, line 64 to column 4, line 12).

With respect to claim 11, Dubinsky discloses displacing the logging tool along the borehole so as to provide a continuous characterizing of the formation as a function of depth (column 1, lines 9-18 and column 3, lines 22-27).

With respect to claim 12, Dubinsky discloses a system for characterizing a formation surrounding a borehole (column 4, lines 29-42, column 4, line 65 to column 5, line 24, and column 5, lines 59-65), the system comprising: a logging tool to be lowered into the borehole (column 1, lines 9-18 and column 4, line 59 to column 5, line 23); an acoustic emitter located onto the logging tool (column 6, lines 40-44 and Figure 2), the acoustic emitter allowing to excite the formation with an acoustic wave propagating within the formation (column 6, lines 36-47); an electromagnetic receiver to measure a seismo-electromagnetic signal produced by the acoustic wave within the formation (column 6, lines 5-15); an electromagnetic emitter located onto the logging tool (column 6, lines 8-12 and Figure 1), the electromagnetic emitter allowing to excite the formation with an electromagnetic exciting field (column 6, lines 5-15); an acoustic receiver to measure a electromagneto-seismic signal produced by the electromagnetic exciting field within the formation (column 6, lines 36-47); processing means to analyze the measured seismo-electromagnetic signal and the measured electromagneto-seismic signal so as to evaluate characterizing parameters of the formation (column 6, lines 15-18 and 45-52).

With respect to claim 14, Dubinsky discloses that the electromagnetic receiver is a magnetic receiver allowing to measure a seismo-magnetic signal produced by the acoustic wave within the formation (column 6, lines 5-15 – see also Woodward; column 1, lines 14-27 and column 3, line 64 to column 4, line 12).

With respect to claim 16, Dubinsky discloses that the electromagnetic emitter is a magnetic emitter allowing excite the formation with a magnetic exciting field (column 6, lines 5-15 – see also Woodward; column 1, lines 14-27 and column 3, line 64 to column 4, line 12).

With respect to claim 17, Dubinsky discloses at least one additional electromagnetic receiver (column 6, lines 8-12 and Figure 1); at least one additional acoustic receiver (column 6, lines 40-44 and Figure 2).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dubinsky in view of U.S. Patent No. 5,809,458 to Tamarchenko.

As noted above, the invention of Dubinsky teaches many of the features of the claimed invention and while Dubinsky does teach characterizing a formation with a logging tool based on actual and simulated seismo-electromagnetic and electromagneto-seismic signals (Dubinsky; column 6, lines 5-15 and 36-17 and column 9, lines 33-66), Dubinsky does not explicitly include means for generating a synthesized signal based on inversion parameters.

Tamarchenko teaches a method for simulating the response of a through-casing electrical resistivity well logging instrument and its application to determining resistivity of earth formations comprising selecting initial values of inversion parameters (column 8, lines 13-18 and column 9, lines 20-31); synthesizing a synthesis electric signal (column 3, line 47 to column 4, line 5) using the initial values of the inversion parameters (column 8, lines 44-48); calculating a difference between the synthesis electric signal and the measured electric signal (column 9, lines 6-12), adjusting the values of the inversion parameters according to the difference (column 9, lines 12-14); repeating the synthesizing using the adjusted values of the inversion parameters, the calculating of the difference, and the adjusting until the difference drops below a predetermined threshold (column 9, lines 14-20).

It would have been obvious to one having ordinary skill in the art to modify the invention of Dubinsky to explicitly include means for generating a synthesized signal based on inversion parameters, as taught by Tamarchenko, because, as suggested by Tamarchenko, the combination would have improved the system of Dubinsky by simulating a response of the well logging tool of Dubinsky for comparison to actual measurements in order to determine specific geological structures of the earth formations in a method that ensures accuracy by calibrating the system to desired parameters (column 1, lines 47-58 and column 9, lines 6-20).

Further, since the invention of Dubinsky does teach characterizing a formation with a logging tool based on both seismo-electromagnetic and electromagneto-seismic signals (Dubinsky; column 6, lines 5-15 and 36-17 and column 9, lines 33-

66), the combination would have performed the synthesis for each of the seismo-electromagnetic and electromagneto-seismic signals.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dubinsky in view of Tamarchenko and further in view of U.S. Patent No. 5,841,280 to Yu et al. and U.S. Patent No. 6,351,991 to Sinha.

As noted above, the invention of Dubinsky and Tamarchenko teaches many of the features of the claimed invention and while the invention of Dubinsky and Tamarchenko does teach generating synthesized seismo-electromagnetic and electromagneto-seismic signals based on inversion parameters, the combination is not explicit as to what constitutes the inversion parameters.

Yu teaches an apparatus and method for combined acoustic and seismoelectric logging measurements comprising means for calculating a synthetic seismoelectric signal (column 10, lines 31-33) based on inversion parameters of electrokinetic coupling coefficient (column 8, lines 32-36) and mobility (column 7, lines 39-42).

It would have been obvious to one having ordinary skill in the art to modify the invention of Dubinsky and Tamarchenko to specify the inversion properties of an electrokinetic coupling coefficient and mobility, as taught by Yu, because, as suggested by Yu, electriokinetic coupling and mobility are important parameters for properly modeling a seismic signal and, therefore, the combination would have improved the synthesizing and, consequently, the resulting determination of

formation characteristics in Dubinsky and Tamarchenko by setting such important parameters as initial values (column 7, lines 39-42 and column 8, lines 32-36).

As noted above, the invention of Dubinsky, Tamarchenko, and Yu teaches many of the features of the claimed invention and while the invention of Dubinsky, Tamarchenko, and Yu does teach generating synthesized seismo-electromagnetic and electromagneto-seismic signals based on inversion parameters of an electrokinetic coupling coefficient and mobility, the combination does not specify simplifying the synthesizing by synthesizing only slow longitudinal signals.

Sinha teaches determining stress parameters of formations from multi-mode velocity data including means for determining formation parameters by inversion (column 5, lines 10-15) to model transmission/reception seismic velocities (column 5, lines 16-27) wherein the modeling is simplified by synthesizing each of a plurality of modes individually, including a single mode of slow longitudinal signals (column 4, lines 5-9 and column 5, lines 28-49)

It would have been obvious to one having ordinary skill in the art to modify the invention of Dubinsky, Tamarchenko, and Yu to specify simplifying the synthesizing by synthesizing only slow longitudinal signals, as taught by Sinha, because, as suggested by Sinha, the combination would have improved the synthesis of Dubinsky, Tamarchenko, and Yu by providing individual synthesis per mode thereby reducing the complexity and, consequently, providing greater accuracy by reducing the chance of error (column 4, lines 5-9 and column 5, lines 28-49).

8. Claims 8, 10, 13, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dubinsky in view of U.S. Patent No. 5,955,884 to Payton et al.

As noted above, the invention of Dubinsky teaches many of the features of the claimed invention and while Dubinsky does teach that the seismo- electromagnetic signal is a seismo-electric signal (i.e. measured using a hydrophone) (column 6, lines 35-48), that the electromagneto- seismic signal is a magneto-seismic signal (column 6, lines 5-15 – see also Woodward; column 1, lines 14-27 and column 3, line 64 to column 4, line 12), that the electromagnetic receiver is a magnetic receiver allowing to measure a seismo-magnetic signal produced by the acoustic wave within the formation (column 6, lines 5-15 – see also Woodward; column 1, lines 14-27 and column 3, line 64 to column 4, line 12), and that the electromagnetic emitter is a magnetic emitter allowing excite the formation with a magnetic exciting field (column 6, lines 5-15 – see also Woodward; column 1, lines 14-27 and column 3, line 64 to column 4, line 12), Dubinsky does not explicitly teach employing a system where the magnetic and electric transmission/reception are interchanged.

Payton teaches a method and apparatus for measuring transient electromagnetic and electrical energy components propagated in an earth formation comprising means for receiving a seismo-magnetic seismo- electromagnetic signal (column 8, lines 18-24) and/or an electro-seismic electromagneto- seismic signal (column 8, lines 24-29) and additionally teaches wherein an electromagnetic receiver is an electric receiver allowing to measure a seismo-electric signal produced by the acoustic wave within the formation (column 8, lines 9-43) and that the

electromagnetic emitter is an electric emitter allowing excite the formation with an electric exciting field (column 7, lines 28-53).

It would have been obvious to one having ordinary skill in the art to modify the invention of Dubinsky to explicitly teach employing a system where the magnetic and electric transmission/reception are interchanged, as taught by Payton, because, as suggested by Payton, the combination would have provided means for transmitting/receiving both electrical/magnetic signals as part of a TEM tool that, through the combination of the measured electric and magnetic signals interchangeably, is capable of determining a wider variety of characteristics of the formation (column 10, lines 7-28 and column 10, line 40 to column 11, line 3).

Response to Arguments

9. Applicant's arguments filed June 04, 2009, have been fully considered but they are not persuasive.

Applicant argues:

> Applicant disagrees with the Examiner's objection regarding the drawings having blank boxes that are not numbered. More specifically, every blank box of Figures 1 and 4 is numbered. Figure 5 labels most of its geographical shapes and is easily understood by the skilled reader in conjunction with the associated description.

The Examiner asserts that per MPEP § 608.02 (n)(o), “symbols which are not universally recognized may be used, subject to approval by the Office, if they are not likely to be confused with existing conventional symbols, and if they are readily identifiable” and “descriptive legends may be used subject to approval by the Office,

or may be required by the examiner where necessary for understanding of the drawing". The Examiner asserts that the blank boxes in Figures 1, 4, and 5 are not universally recognized and should be provided with descriptive legends to aid in understanding of the drawing.

Applicant argues:

> Claim 1 recites a number of method steps, which the examiner asserts are disclosed in Dubinsky, but claim 1 has been amended to recite that said steps are performed by the same logging tool. This is wholly different from Dubinsky, which incorporates by reference the teaching of Woodward (US 5,001,675). Specifically, column 6 lines 5-18 of Dubinsky incorporates the teaching of Woodward as an example of a 'resistivity measuring device' (see col. 6 line 2). The examiner also then refers to a separate passage at column 6 lines 25-52 of Dubinsky, which describes an 'accoustic sensing device' (see line 36). Thus the two passages of Dubinsky relied on by the examiner refer to separate devices, a resisitivity measuring device and an acoustic sensing device.
>
> There is no suggestion in Dubinsky as to how, or indeed if, these separate devices should be combined into a single logging tool as claimed. If anything Dubinsky teaches the opposite in describing a preference for the downhole assembly to be modular in construction (col 5 lines 55- 56), that the acoustic device may be located at any suitable location in the downhole assembly (col 6 lines 36-38), and describing portions of the downhole assembly (see col 7 lines 20-23).
>
> Thus, in Dubinsky different devices are performing different measurements. There is no disclosure of a logging tool capable of performing a processing step combining these two types of measurements, i.e. seismoelectric and electroseismic.

The Examiner first asserts that the invention of Dubinsky is explicit in teaching that the exciting and measuring devices are part of a single logging tool, specifically disclosing a method for characterizing a formation with a logging tool positioned within a borehole surrounded by the formation (column 4, lines 29-42, column 4, line 65 to column 5, line 24, and column 5, lines 59-65) the method comprising: exciting

with the logging tool the formation with an acoustic wave propagating into the formation (column 3, lines 28-42 and column 6, lines 36-47); measuring with the logging tool a seismo-electromagnetic signal produced by the acoustic wave within the formation (column 3, lines 28-42 and column 6, lines 36-47); exciting with the logging tool the formation with an electromagnetic exciting field (column 6, lines 5-15); measuring with the logging tool an electromagneto-seismic signal produced by the electromagnetic exciting field within the formation (column 3, lines 28-42 and column 6, lines 5-15); and analyzing the measured seismo-electromagnetic signal and the measured electromagneto- seismic signal to evaluate characterizing parameters of the formation (column 6, lines 15-18 and 45-52):

> In one embodiment of the invention, an acoustic source is actuated on the logging tool generating both a tool mode that propagates through body of the tool and a formation mode that propagates through the borehole fluid into the formation, through the formation and back through the borehole to the tool. A hydrophone on the tool detects a signal that is a combination of the formation mode signal and the tool mode signal. A reference accelerometer proximate to the hydrophone measures a signal that is dominated by the tool mode. An adaptive filter is derived for attenuation of the tool mode component of the signal received by the hydrophone. A novel feature of the invention is that the derivation and application of the filter is done on time-reversed versions of the accelerometer and hydrophone signals. (column 3, lines 28-42)

> In general, the present invention provides an apparatus for making measurements of formation acoustic properties during the drilling of a borehole. The drilling system contains a drill string having a downhole subassembly that includes a drill bit at its bottom end and a plurality of sensors and MWD devices, including an acoustic MWD system having a first set of acoustic sensors for determining the formation acoustic velocity while drilling the borehole. A downhole computer and associated memory are provided for computing various downhole operating parameters, to map the formation around the downhole subassembly, to update stored models and data as a result of the computed

parameters and to aid the driller in navigating the drill string along a desired wellbore profile. (column 4, lines 29-42)

The drill string 20 is coupled to a drawworks 30 via a kelly joint 21, swivel 28 and line 29 through a system of pulleys 27. During the drilling operations, the drawworks 30 is operated to control the weight on bit and the rate of penetration of the drill string 20 into the borehole 26. The operation of the drawworks is well known in the art and is thus not described in detail herein.

During drilling operations a suitable drilling fluid (commonly referred to in the art as "mud") 31 from a mud pit 32 is circulated under pressure through the drill string 20 by a mud pump 34. The drilling fluid 31 passes from the mud pump 34 into the drill string 20 via a desurger 36, fluid line 38 and the kelly joint 21. The drilling fluid is discharged at the borehole bottom 51 through an opening in the drill bit 50. The drilling fluid circulates uphole through the annular space 27 between the drill string 20 and the borehole 26 and is discharged into the mud pit 32 via a return line 35. Preferably, a variety of sensors (not shown) are appropriately deployed on the surface according to known methods in the art to provide information about various drilling-related parameters, such as fluid flow rate, weight on bit, hook load, etc. (column 4, line 65 to column 5, line 24)

Still referring back to FIG. 1, the BHA also preferably contains sensors and devices in addition to the above-described sensors. Such devices include a device for measuring the formation resistivity near and/or in front of the drill bit, a gamma ray device for measuring the formation gamma ray intensity and devices for determining the inclination and azimuth of the drill string. (column 5, lines 59-65)

This patent describes a dual propagation resistivity device ("DPR") having one or more pairs of transmitting antennae 66a and 66b spaced from one or more pairs of receiving antennae 68a and 68b. Magnetic dipoles are employed which operate in the medium frequency and lower high frequency spectrum. In operation, the transmitted electromagnetic waves are perturbed as they propagate through the formation surrounding the resistivity device 64. The receiving antennae 68a and 68b detect the perturbed waves. Formation resistivity is derived from the phase and amplitude of the detected signals. (column 6, lines 5-15)

FIG. 2 is a schematic diagram of an acoustic sensing device that may be located at any suitable location in the downhole subassembly. Shown is a borehole 55 within an earth formation 100 with the body 106 of the acoustic subassembly. A transmitter 104 on the body 104 of the acoustic subassembly

> produces acoustic signals that travel through the annulus 102 between the body 104 and the borehole wall 55, taking the path indicated by 120 and travels back to the body to be detected by receivers 110. (column 6, lines 36-47)

(Also see Figures 1 and 2 which clearly illustrate the exciting and measuring devices located on the same logging tool)

Secondly, the Examiner asserts that Dubinsky's incorporation of Woodward is not to modify any placement of any exciting/measuring devices, but only to specify that the electromagneto- seismic signal is a magneto-seismic signal (column 6, lines 5-15 – see also Woodward; column 1, lines 14-27 and column 3, line 64 to column 4, line 12).

Applicant argues:

> Examiner has rejected dependent claim 4 as being obvious over Dubinsky in view of Tamarchenko (US 5,809,458). Applicant asserts that this objection has been overcome in light of the aforementioned difference of claim 1 over Dubinsky.
>
> Specifically Dubinsky appears to refer to two different tools, but does not disclose any technical solution for building a single tool. It would not have been obvious to a person skilled in the art to perform two different measurements on a single tool or more importantly, to combine them. It is advantageous to have an array of receivers for performing both measurements (seismoelectric and electroseismic) at the same location and source for both types of excitation at substantially the same location. The combination helps accurately determine in the properties of the formation at a particular location.
>
> There is no teaching in either Dubinsky, Tamarchenko or any of the citations relied upon of developing a single logging tool that is capable of combining both seismoelectric and electroseismic measurements as recited in both claims 1 and 12 of the present invention.

The Examiner asserts that these arguments are not considered to be persuasive since, as noted above, the invention of Dubinsky does teach the claimed measuring and exciting with the logging tool.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure:

U.S. Patent No. 4,894,808 to Pedley et al. teaches flow noise reduction comprising a hydrophone that measures an electric signal (abstract).

U.S. Patent Application Publication No. 2003/0151977 to Shah et al. teaches dual channel downhole telemetry.

U.S. Patent Application Publication No. 2002/0134587 to Rester et al. teaches a method, system and tool for reservoir evaluation and well testing during drilling operations.

U.S. Patent Application Publication No. 2005/0049792 to Yu et al. teaches real-time processing of multicomponent induction tool data in highly deviated and horizontal wells.

U.S. Patent Application Publication No. 2004/0128073 to Radtke et al. teaches formation evaluation through azimuthal measurements.

U.S. Patent No. 6,018,501 to Smith et al. teaches subsea repeater and method for use of the same.

U.S. Patent Application Publication No. 2002/0020533 to Tubel teaches a production well telemetery system and method.

U.S. Patent No. 6,177,882 to Ringgenberg et al. teaches electromagnetic-to-acoustic and acoustic-to-electromagnetic repeaters and methods for use of the same.

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey R. West whose telephone number is

(571)272-2226. The examiner can normally be reached on Monday through Friday, 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eliseo Ramos-Feliciano can be reached on (571)272-7925. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jeffrey R. West/
Primary Examiner, Art Unit 2857

July 29, 2009